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Data Validation Summary Report - 300-FF-5 Operable Unit Round 7 Groundwater and Round 2 Near- Shore River Sampling



Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

Bechtel Hanford, Inc.
Richland, Washington

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Author
L. C. Hulstrom

Date Published
September 1994



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1.0 INTRODUCTION

This report presents a summary of data validation results on water samples collected for the 300-FF-5 Seventh Round Groundwater and Phase II Remedial Investigation Near-shore River Sampling tasks.

The analyses performed for this project consisted of:

- Volatile Organic Compounds;
- Metals;
- Radiochemistry: total uranium.

The laboratories used for the analyses were the International Technology Corporation Laboratory (now known as Quanterra) and the Thermo Analytical (TMA) laboratory.

As required by the contract and the WHC statement of work (WHC 1994), data validation was conducted using Westinghouse data validation procedures (WHC 1993a and 1993b), in which the sample results were validated to level D as specified in the data validation procedures. At the completion of validation and verification of each data package, a data validation summary was prepared and transmitted with the original documentation to Hanford Analytical Services (HAS) for inclusion in the project QA record. Table 1-1 provides information concerning the data packages which were validated and verified. Tables 1-2, 1-3 and 1-4 provide a summary and explanation of all qualifiers applied to the validated organic, inorganic and radiochemistry results, respectively.

Five sections, including this introduction, comprise this report. Sections 2.0 through 4.0 provide summaries of the validation of the volatile organics, metals and radiochemistry parameters, respectively. Section 5.0 provides a list of references used to prepare this report and Appendixes A through F to this report include validated data summary tables.

1.1 CHEMICAL ANALYSES

Chemical analysis data consists of 22 water samples analyzed for target compound list (TCL) organics and 70 water samples analyzed for target analyte list (TAL) metals. The chemical data and associated QC has been reviewed and validated to verify that reported sample results are acceptable for decision making purposes.

1.2 RADIOCHEMICAL ANALYSES

The radiochemical data consists of 42 water samples analyzed for total uranium. The radiochemical data and associated QC has been reviewed and validated to verify that reported sample results are acceptable for decision making purposes.

1.3 WESTINGHOUSE HANFORD GUIDANCE USED

Data validation was conducted using Westinghouse data validation procedures (WHC 1993a and 1993b).

1.4 MAJOR DEFICIENCIES

No major deficiencies were identified during the validation of the volatile, metal, and radiochemistry parameters.

1.5 GENERAL QUALITY TRENDS

The objectives of this project were to validate the samples against level D validation criteria specified in the validation procedures (WHC 1993a and 1993b). In addition, this report provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 300-FF-5 Seventh Round Groundwater and Phase II Remedial Investigation Near-shore River Sampling tasks. For purposes of this report, the validated results were reviewed against the following data quality indicators:

- Precision of laboratory and field duplicate measurements;
- Accuracy in terms of laboratory spikes, control samples, laboratory and field blanks and proper reporting;
- Representativeness in terms of field duplicate analyses;
- Completeness in terms of compliance with holding times, the percentage of valid measurements versus the total number of measurements performed and correctness of results; and
- Comparability in terms of field split samples and reporting units.

1.6 SAMPLES AND ANALYSES VALIDATED

Table 1-1 provides a cross-reference list of all samples validated including data package tracking numbers, HEIS sample numbers, sample dates, site and sample locations, sample type, and analyses performed.

Table 1-1. 300-FF-5 Data Validation, List of Samples Validated. (Sheet 1 of 3)

Data Package ID	Sample ID	Sample Date	Site ^{1,2}	Location	Sample Type ³	VOA	METALS	TOTAL U
W0106-ITC-095	B0BZJ8	23-Jun-94	GW	3-1-7	INVEST	X	X	X
W0106-ITC-095	B0BZJ9	23-Jun-94	GW	3-1-7	INVEST		X	
W0106-ITC-095	B0BZK6	23-Jun-94	GW	3-2-2	DUPLICATE		X	
W0106-ITC-095	B0BZK7	23-Jun-94	GW	3-2-2	DUPLICATE		X	
W0106-ITC-095	B0BZK8	22-Jun-94	GW	3-3-2	INVEST	X	X	X
W0106-ITC-095	B0BZK9	22-Jun-94	GW	3-3-2	INVEST		X	
W0106-ITC-095	B0BZL0	22-Jun-94	GW	3-3-11	INVEST	X	X	X
W0106-ITC-095	B0BZL1	22-Jun-94	GW	3-3-11	INVEST		X	
W0106-ITC-095	B0BZL2	22-Jun-94	GW	3-3-11	DUPLICATE	X	X	X
W0106-ITC-095	B0BZL3	22-Jun-94	GW	3-3-11	DUPLICATE		X	
W0106-ITC-095	B0BZL4	22-Jun-94	GW	3-3-12	INVEST	X	X	X
W0106-ITC-095	B0BZL5	22-Jun-94	GW	3-3-12	INVEST		X	
W0106-ITC-095	B0BZM4	22-Jun-94	GW	3-4-12	INVEST	X	X	X
W0106-ITC-095	B0BZMS	22-Jun-94	GW	3-4-12	INVEST		X	
W0106-ITC-095	B0BZM6	22-Jun-94	GW	3-3-11	EQUIP BLANK	X	X	X
W0106-ITC-095	B0BZM7	22-Jun-94	GW	3-3-11	EQUIP BLANK		X	
W0106-ITC-095	B0BZM8	22-Jun-94	GW	3-3-12	EQUIP BLANK	X	X	X
W0106-ITC-095	B0BZM9	22-Jun-94	GW	3-3-12	EQUIP BLANK		X	
W0106-ITC-095	B0BZN1	23-Jun-94	GW	3-1-7	TRIP BLANK	X		
W0106-ITC-095	B0BZN2	22-Jun-94	GW	3-3-11	TRIP BLANK	X		
W0107-ITC-104	B0BZJ2	24-Jun-94	GW	3-1-5	INVEST	X	X	X
W0107-ITC-104	B0BZJ3	24-Jun-94	GW	3-1-5	INVEST		X	
W0107-ITC-104	B0BZJ6	24-Jun-94	GW	3-1-5	DUPLICATE		X	
W0107-ITC-104	B0BZJ7	24-Jun-94	GW	3-1-5	DUPLICATE		X	
W0107-ITC-104	B0BZK0	24-Jun-94	GW	3-1-16C	INVEST	X	X	X
W0107-ITC-104	B0BZK1	24-Jun-94	GW	3-1-16C	INVEST		X	
W0107-ITC-104	B0BZK2	24-Jun-94	GW	3-1-21A	INVEST	X	X	X
W0107-ITC-104	B0BZK3	24-Jun-94	GW	3-1-21A	INVEST		X	
W0107-ITC-104	B0BZK4	23-Jun-94	GW	3-2-2	INVEST	X	X	X
W0107-ITC-104	B0BZK5	23-Jun-94	GW	3-2-2	INVEST		X	
W0107-ITC-104	B0BZL6	23-Jun-94	GW	3-4-7	INVEST	X	X	X
W0107-ITC-104	B0BZL7	23-Jun-94	GW	3-4-7	INVEST		X	
W0107-ITC-104	B0BZM0	23-Jun-94	GW	3-4-10	INVEST	X	X	X
W0107-ITC-104	B0BZM1	23-Jun-94	GW	3-4-10	INVEST		X	
W0107-ITC-104	B0BZM2	23-Jun-94	GW	3-4-10	DUPLICATE	X	X	X
W0107-ITC-104	B0BZM3	23-Jun-94	GW	3-4-10	DUPLICATE		X	
W0107-ITC-104	B0BZN0	23-Jun-94	GW	3-4-7	TRIP BLANK	X		
W0107-ITC-104	B0BZN3	23-Jun-94	GW	3-2-2	TRIP BLANK	X		
W0107-ITC-104	B0BZN4	24-Jun-94	GW	3-1-5	TRIP BLANK	X		
W0109-ITC-097	B0C2R3	23-Jun-94	River	SPRING 6,3 ft	INVEST			X
W0109-ITC-097	B0C2R4	23-Jun-94	River	SPRING 6,3 ft	INVEST		X	X

Table 1-1. 300-FF-5 Data Validation, List of Samples Validated. (Sheet 2 of 3)

Data Package ID	Sample ID	Sample Date	Site ^{1,2}	Location	Sample Type ³	VOA	METALS	TOTAL U
W0109-ITC-097	B0C2R5	23-Jun-94	River	SPRING 6,3 ft	INVEST		X	
W0109-ITC-097	B0C2R6	23-Jun-94	River	SPRING 6,10 ft	INVEST			X
W0109-ITC-097	B0C2R7	23-Jun-94	River	SPRING 6,10 ft	INVEST		X	X
W0109-ITC-097	B0C2R8	23-Jun-94	River	SPRING 6,10 ft	INVEST		X	
W0109-ITC-097	B0C2R9	23-Jun-94	River	SPRING 6,20 ft	INVEST			X
W0109-ITC-097	B0C2S0	23-Jun-94	River	SPRING 6,20 ft	INVEST		X	X
W0109-ITC-097	B0C2S1	23-Jun-94	River	SPRING 6,20 ft	INVEST		X	
W0109-ITC-097	B0C2T2	23-Jun-94	River	SPRING 9,20 ft	INVEST			X
W0109-ITC-097	B0C2T3	23-Jun-94	River	SPRING 9,20 ft	INVEST		X	X
W0109-ITC-097	B0C2T4	23-Jun-94	River	SPRING 9,20 ft	INVEST		X	
W0109-ITC-097	B0C2T5	23-Jun-94	River	SPRING 11,3 ft	INVEST			X
W0109-ITC-097	B0C2T6	23-Jun-94	River	SPRING 11,3 ft	INVEST		X	X
W0109-ITC-097	B0C2T7	23-Jun-94	River	SPRING 11,3 ft	DUPLICATE		X	X
W0109-ITC-097	B0C2T8	23-Jun-94	River	SPRING 11,3 ft	INVEST		X	
W0109-ITC-097	B0C2T9	23-Jun-94	River	SPRING 11,3 ft	DUPLICATE		X	
W0109-ITC-097	B0C2V0	23-Jun-94	River	SPRING 11,10 ft	INVEST			X
W0109-ITC-097	B0C2V1	23-Jun-94	River	SPRING 11,10 ft	INVEST		X	X
W0109-ITC-097	B0C2V2	23-Jun-94	River	SPRING 11,10 ft	INVEST		X	
W0109-ITC-097	B0C2V3	23-Jun-94	River	SPRING 11,20 ft	INVEST			X
W0109-ITC-097	B0C2V4	23-Jun-94	River	SPRING 11,20 ft	INVEST		X	X
W0109-ITC-097	B0C2V5	23-Jun-94	River	SPRING 11,20 ft	INVEST		X	
W0109-ITC-097	B0C2V6	23-Jun-94	River	SPRING 11	EQUIP BLANK		X	X
W0109-ITC-097	B0C2V9	23-Jun-94	River	SPRING 11	EQUIP BLANK		X	
W0109-ITC-097	B0C2W2	23-Jun-94	River	SPRING 11	EQUIP BLANK		X	X
W0109-ITC-097	B0C2W3	23-Jun-94	River	SPRING 11	EQUIP BLANK		X	
W0110-ITC-103	B0C2S2	23-Jun-94	River	SPRING 9,3 ft	INVEST			X
W0110-ITC-103	B0C2S3	23-Jun-94	River	SPRING 9,3 ft	INVEST		X	X
W0110-ITC-103	B0C2S4	23-Jun-94	River	SPRING 9,3 ft	DUPLICATE		X	X
W0110-ITC-103	B0C2S5	23-Jun-94	River	SPRING 9,3 ft	INVEST		X	
W0110-ITC-103	B0C2S6	23-Jun-94	River	SPRING 9,3 ft	DUPLICATE		X	
W0110-ITC-103	B0C2S7	23-Jun-94	River	SPRING 9,10 ft	INVEST			X
W0110-ITC-103	B0C2S8	23-Jun-94	River	SPRING 9,10 ft	INVEST		X	X
W0110-ITC-103	B0C2S9	23-Jun-94	River	SPRING 9,10 ft	DUPLICATE		X	X
W0110-ITC-103	B0C2T0	23-Jun-94	River	SPRING 9,10 ft	INVEST		X	
W0110-ITC-103	B0C2T1	23-Jun-94	River	SPRING 9,10 ft	DUPLICATE		X	
BOBZJ4-TMA-784	B0BZJ4	24-Jun-94	GW	3-1-5	SPLIT	X	X	X
BOBZJ4-TMA-784	B0BZJ5	24-Jun-94	GW	3-1-5	SPLIT		X	
BOBZJ4-TMA-784	B0BZL8	23-Jun-94	GW	3-4-7	SPLIT	X	X	X
BOBZJ4-TMA-784	B0BZL9	23-Jun-94	GW	3-4-7	SPLIT		X	
B0C2V7-TMA-786	B0C2V7	23-Jun-94	River	SPRING 6,3 ft	SPLIT		X	X
B0C2V7-TMA-786	B0C2V8	23-Jun-94	River	SPRING 6,3 ft	SPLIT		X	

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Table 1-1. 300-FF-5 Data Validation, List of Samples Validated. (Sheet 3 of 3)

Data Package ID	Sample ID	Sample Date	Site ^{1,2}	Location	Sample Type ³	VOA	METALS	TOTAL U
B0C2V7-TMA-786	B0C2W0	23-Jun-94	River	SPRING 11,10 ft	SPLIT		X	X
B0C2V7-TMA-786	B0C2W1	23-Jun-94	River	SPRING 11,10 ft	SPLIT		X	

¹ GW - 300-FF-5 Round 7 Groundwater.
² Samples were taken from the Columbia River adjacent to the 300 Area at identified spring locations.
³ Sample types indicated are investigative (INVEST), duplicate (DUP) and trip blanks (TRIP).

Table 1-2. Glossary of Organic Data Reporting Qualifiers.

- B -** Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.
- U -** Indicates the constituent was analyzed for and not detected. The concentration reported is the sample quantitation limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ -** Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.
- UJN -** Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.
- J -** Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.
- NJ -** Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- N -** Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- JN -** Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.
- UR -** Indicates the constituent was analyzed for and not detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R -** Indicates the constituent was analyzed for and detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

Table 1-3. Glossary of Inorganic Data Reporting Qualifiers.

- B -** Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U -** Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ -** Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.
- BJ -** Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- J -** Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- UR -** Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.
- R -** Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

Table 1-4. Glossary of Radiochemistry Data Reporting Qualifiers.

- U -** Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ -** Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.
- J -** Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.
- UR -** Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R -** Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

2.0 VOLATILE ORGANIC ANALYSIS DATA VALIDATION SUMMARY

2.1 SUMMARY

This section presents a summary of the volatile organic data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix A provides a summary of all validated data results.

2.1.1 Three Sample Delivery Groups

Sample results from three volatile organic data packages are included in this report:

Data Package ID	No. of Samples
W0106-ITC-095	10
W0107-ITC-104	10
B0BZJ4-TMA-784	2

2.1.2 All Samples Validated

Results for the data packages listed above were validated at the frequency specified in Section 1.0 with data qualifiers assigned as specified in the validation procedures.

2.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Chemical Analyses (WHC 1993a).

2.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 300-FF-5 Seventh Round Groundwater and Phase II Remedial Investigation Near-shore River Sampling Projects tasks.

- Precision.** All matrix spike/matrix spike duplicate sample RPD results were acceptable with the exception of trichloroethene and toluene (see Section 2.5).
- Accuracy.** All matrix spike/matrix spike duplicate, surrogate and internal standards were within specified control limits.
- Representativeness.** Field duplicate RPD values were acceptable for all sample sets.

- **Completeness.** Overall, 22 water samples were validated for volatiles with 726 results reported, all of which were deemed valid. This results in a completeness of 100% which meets normal work plan QAPjP objectives of 90%.
- **Comparability.** Field split RPD values were acceptable for all sample sets. All results were reported in common units (micrograms per liter, $\mu\text{g}/\text{L}$) facilitating comparison of the data.

2.1.5 Deficiencies Noted

There were no major deficiencies identified during validation. Minor deficiencies were identified requiring qualification of the data which are explained in greater detail below.

2.2 ANALYTICAL METHOD

The following paragraphs summarize the analytical requirements for the volatiles analyses.

2.2.1 GC/MS Tuning and Calibration

Compliance with equipment systems requirements demonstrates the analytical instrument was capable of producing acceptable quantitative results prior to the analysis of all samples. All GC/MS tuning, initial and continuing calibration requirements were met.

2.2.2 Blanks

2.2.2.1 Laboratory Blanks. Laboratory method blanks were analyzed at the proper frequency and results were acceptable with the exception of low concentrations of target compounds detected in the following data packages:

Data packages W0106-ITC-095 and W0107-ITC-104. Methylene chloride and acetone were detected in the associated method blanks resulting in qualification of the sample results as undetected (U).

In accordance with the validation requirements, sample results associated with the detected blank compounds were qualified as undetected (U) for sample results less than ten times the associated blank concentration since all blank contaminants were considered common laboratory contaminants.

2.2.2.2 Field Blanks. Samples B0BZN0, B0BZN1, B0BZN2, B0BZN3 and B0BZN4 were identified as trip blanks with chloroform detected in samples B0BZN0 and B0BZN1 at concentrations of 2 $\mu\text{g}/\text{L}$ and 1 $\mu\text{g}/\text{L}$, respectively.

Samples B0BZM6 and B0BZM8 were identified as equipment blanks with chloroform detected in samples B0BZM6 and B0BZM8 at concentrations of 2 $\mu\text{g}/\text{L}$ and 3 $\mu\text{g}/\text{L}$, respectively.

Qualification of sample results based on field blank results is not a requirement of the validation procedures.

2.3 HOLDING TIMES

All validated samples were analyzed within the required holding time.

2.4 ANALYTICAL ACCURACY

2.4.1 Surrogates

The surrogate recoveries for all samples were within the specified control limits.

2.4.2 Matrix Spike and Matrix Spike Duplicates

The matrix spike and matrix spike duplicate percent recoveries were all within specified control limits.

2.4.3 Internal Standards Performance

All internal standard retention times and areas were within the specified control limits for all samples.

2.5 ANALYTICAL PRECISION

2.5.1 Matrix Spike/Matrix Spike Duplicates

The matrix spike and matrix spike duplicate relative percent differences were within the specified control limits for all data packages with the exception of the following:

Data Package W0106-ITC-095. Toluene.

Data Package W0107-ITC-104. Trichloroethene and toluene.

In accordance with the validation requirements, sample results associated with the above MS/MSD compounds have been qualified as estimated (J for detects, UJ for nondetects).

2.5.2 Field Duplicates

A total of one sample was identified as a field duplicate and was analyzed for target compound list (TCL) volatile organics. Appendix B presents a summary of the primary and duplicate sample results and the calculated RPD values. All RPD values were compared to the limits of 20% and \pm CRQL and were acceptable.

2.5.3 Field Splits

A total of two samples were identified as field splits and were analyzed for TCL volatile organics. Appendix B presents a summary of the primary and field split sample results and the calculated RPD values. All RPD values were compared to the limits of 20% and \pm CRQL and were acceptable.

2.6 COMPOUND IDENTIFICATION

The compound identification and confirmation were acceptable for all validated samples.

2.7 SAMPLE RESULT QUANTITATION, VERIFICATION, AND REPORTED DETECTION LIMITS

All sample results were verified and recalculated against the raw data and were acceptable with the exception of acetone for sample B0BZJ4 which was corrected from undetected to 4 $\mu\text{g/L}$ according to the raw data. Correct internal standards, quantitation ions and relative response factors were used for the quantitation of validated results. Sample quantitation limits for all samples were calculated correctly and properly reported.

2.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data. No indications of poor performance were noted such as shifting RIC baselines or poor chromatographic resolution.

3.0 METALS DATA VALIDATION SUMMARY

3.1 SUMMARY

This section presents a summary of the inorganic data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix C provides a summary of all validated data results:

3.1.1 Six Sample Delivery Groups

Sample results from six inorganic data packages are included in this report:

Data Package ID	No. of Samples
W0106-ITC-095	18
W0107-ITC-104	16
W0109-ITC-097	20
W0110-ITC-103	8
B0BZJ4-TMA-784	4
B0C2V7-TMA-786	4

3.1.2 All Samples Validated

Results for the data packages listed above were validated at the frequency specified in Section 1.0 with data qualifiers assigned as specified in the validation procedures.

3.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Chemical Analyses (WHC 1993a).

3.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 300-FF-5 Seventh Round Groundwater and Phase II Remedial Investigation Near-shore River Sampling tasks.

- **Precision.** Laboratory duplicate RPD results were acceptable with the exception of iron and manganese in one of the six data packages.

Laboratory ICP serial dilution percent difference (%D) performances were acceptable with the exception of exceedances for magnesium and sodium in one of the six data packages.

Field duplicate RPD values were acceptable with the exception of zinc for samples B0BZL1/B0BZL3.

- **Accuracy.** Laboratory spike recoveries were acceptable with the exception of aluminum in one of the six data packages.
- **Representativeness.** Field duplicate RPD values were acceptable with the exception of zinc in one of the six data packages.
- **Completeness.** Overall, 70 samples were validated for metals with 1260 results reported, of which all were deemed valid. This results in a completeness of 100% which meets normal work plan completeness objectives of 90% for precision and accuracy.
- **Comparability.** All results were reported in common units ($\mu\text{g/L}$) facilitating comparison of the data.

3.1.5 Deficiencies Noted

There were no major deficiencies identified during validation. Minor deficiencies were identified requiring qualification of the data which are explained in greater detail below.

3.2 ANALYTICAL METHOD

The following paragraphs summarize the analytical requirements for the metals analyses.

3.2.1 Initial and Continuing Calibration

Initial and continuing calibration requirements were met for all analyses in all data packages.

3.2.2 Blanks

Laboratory method blanks (initial and continuing calibration and preparation blanks) were analyzed at the proper frequency and results were undetected with the exception of low concentrations of target analytes as summarized in the following sections.

3.2.2.1 Calibration Blanks. The following is a summary of the analytes detected in the calibration blanks:

Data Package W0106-ITC-095. Beryllium and iron were detected in the associated calibration blanks at positive concentrations and chromium, cobalt, copper, manganese, silver and vanadium were detected at negative concentrations.

Data Package W0107-ITC-104. Aluminum, beryllium, iron, manganese and silver were detected in associated calibration blanks at positive concentrations and aluminum, antimony, cadmium, chromium, cobalt, copper, manganese, nickel, silver, vanadium and zinc were detected at negative concentrations.

Data Package W0109-ITC-097. Aluminum, beryllium, calcium, iron, manganese, potassium, sodium, zinc were detected in associated calibration blanks at positive concentrations and antimony, chromium and silver were detected at negative concentrations.

Data Package W0110-ITC-103. Aluminum, iron and manganese were detected in associated calibration blanks at positive concentrations and nickel and silver were detected at negative concentrations.

Data Package B0BZJ4-TMA-784. Barium, chromium, iron, manganese, cadmium, iron, zinc and cadmium were detected in associated calibration blanks at positive concentrations.

Data Package B0C2V7-TMA-786. Zinc was detected in the associated calibration blanks at a positive concentration.

In accordance with the validation requirements, sample results associated with the above calibration blanks were qualified as follows:

- undetected (U) for sample results that are less than five times (5X) the highest associated positive blank concentration, and
- estimated (UJ for non-detects, J for sample results within two times (2X) the absolute value of the associated blank) if associated with negative blank results.

3.2.2.2 Preparation Blanks. The following is a summary of the analytes detected in the preparation blanks:

Data Package W0106-ITC-095. Beryllium, calcium, copper, iron, magnesium, manganese, sodium and vanadium were detected in the preparation blank at positive concentrations and chromium, cobalt, copper, silver and vanadium were detected at negative concentrations.

Data Package W0107-ITC-104. Beryllium, iron and zinc were detected in the preparation blank at positive concentrations and aluminum, cadmium, chromium, cobalt, copper, nickel and silver were detected at negative concentrations.

Data Package W0109-ITC-097. Copper, iron, magnesium, manganese, potassium, sodium and zinc were detected at positive concentrations in the preparation blank.

Data Package W0110-ITC-103. Antimony, iron, manganese, potassium and zinc were detected at positive concentrations in the preparation blank.

Data Package B0BZJ4-TMA-784. Aluminum, barium, chromium, iron, manganese, zinc and cadmium were detected in the preparation blank at positive concentrations and chromium was detected at a negative concentration.

Data Package B0C2V7-TMA-786. Aluminum, barium and zinc were detected at positive concentrations in the preparation blank and chromium and iron were detected at negative concentrations.

In accordance with the validation requirements, sample results associated with the preparation blanks were qualified as follows:

- undetected (U) for positive sample results less than 5X the highest blank concentration if associated with a positive blank result > IDL but < CRDL, and
- estimated (J for detects, UJ for non-detects) if associated with a negative blank and within ten times (10X) the absolute value of the negative blank that is greater than (>) the IDL but less than (<) the CRDL.

3.2.2.3 Field Blanks. Data Package W0109-ITC-097. Samples B0C2V6, B0C2V9, B0C2W2, and B0C2W3 are identified as equipment blanks and all reported results are undetected.

3.3 HOLDING TIMES

Holding time requirements were met for all samples.

3.4 ANALYTICAL ACCURACY

3.4.1 Spike Samples

Spike sample percent recoveries were acceptable with the exception of the following which were out of the 75% to 125% control limits, but greater than 30%:

Data Package B0C2V7-TMA-786. The MS %R for aluminum exceeded the 125% control limit.

In accordance with the validation procedures, positive sample results were qualified as estimated (BJ for detects greater than the IDL and less than the CRDL).

3.4.2 Laboratory Control Samples

All laboratory control sample percent recoveries were within the control limits of 80% to 120% for all data packages.

3.5 ANALYTICAL PRECISION

3.5.1 Laboratory Duplicates

The laboratory duplicate relative percent differences were within the specified control limits with the following exceptions:

Data Package B0C2V7-TMA-786. Iron, manganese.

In accordance with the validation procedures, sample results were qualified as estimated (BJ for detects greater than the IDL and less than the CRDL, and J for detects).

3.5.2 ICP Serial Dilution

The ICP serial dilution %D were less than 10% for the validated samples in which sample concentrations were greater than fifty times the instrument detection limit (IDL) with the exception of the following:

Data Package B0C2V7-TMA-786. Magnesium and sodium.

In accordance with validation procedures, sample results were qualified as estimated (BJ for detects greater than the IDL and less than CRDL, and J for detects).

3.5.3 Field Duplicates

A total of eight samples were identified as field duplicates. Appendix D presents a summary of the primary and duplicate sample results and the calculated RPD values. All RPD values were compared to the limits of 20% and \pm CRDL and were acceptable with the exception of the following analytes for the indicated samples:

Data Package W0106-ITC-095. Zinc for B0BZL1/B0BZL3.

In accordance with the data validation procedures, data qualifiers were not applied based on field duplicate sample results.

3.5.4 Field Splits

A total of 8 samples were identified as field splits. Appendix D presents a summary of the primary and field split sample results and the calculated RPD values. All RPD values were compared to the limits of 20% and \pm CRDL and were acceptable with the exception of the following analytes for the indicated samples:

Data Package B0BZJ4-TMA-784. Iron for samples B0BZL8/B0BZL6.

In accordance with the data validation procedures, data qualifiers were not applied based on field split sample results.

3.6 SAMPLE RESULT QUANTITATION, VERIFICATION, AND REPORTED DETECTION LIMITS

All sample results were verified and confirmed against the raw data with results correctly reported with the exceptions of beryllium for B0BZL1 and B0BZM4, cobalt for B0C2S8, copper for sample B0BZL3, and manganese for samples B0BZM6 and B0BZK5. Sample detection limits were calculated properly and were consistent with method detection limit requirements.

3.7 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data with no indications of poor performance noted.

4.0 RADIOCHEMISTRY DATA VALIDATION SUMMARY

4.1 SUMMARY

This section presents a summary of the radiochemistry data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix E provides a summary of all validated data results.

4.1.1 Six Sample Delivery Groups

Sample results from six radiochemistry data packages are included in this report:

Data Package ID	No. of Samples
W0106-ITC-095	8
W0107-ITC-104	7
W0109-ITC-097	17
W0110-ITC-103	6
B0BZJ4-TMA-784	2
B0C2V7-TMA-786	2

4.1.2 All Samples Validated

Results for the data packages listed above were validated at the frequency specified in Section 1.0 with data qualifiers assigned as specified in the validation procedures.

4.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Radiochemical Analyses (WHC 1993b).

4.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 300-FF-5 Seventh Round Groundwater and Phase II Remedial Investigation Near-shore River Sampling tasks.

- **Precision.** Laboratory duplicate RPD results were acceptable for all data packages.

Field duplicate RPD results were within the limits of 20% or \pm RDL.

- **Accuracy.** Laboratory control sample recoveries were acceptable for all results in all six data packages.
- **Representativeness.** Field duplicate RPD results were within the limits of 20% or \pm RDL.
- **Completeness.** Overall, 42 water samples were validated for radiochemistry with 42 results reported, all of which were deemed valid. This results in a completeness of 100% which meets normal work plan objectives of 90% for precision and accuracy.
- **Comparability.** All results were reported in common units (micrograms per liter, $\mu\text{g/L}$) facilitating comparison of results.

4.1.5 Deficiencies Noted

There were no major deficiencies identified during validation. Minor deficiencies were identified requiring qualification of the data which are explained in greater detail below.

4.2 ANALYTICAL METHOD

The following paragraphs summarize the analytical requirements for the uranium analyses.

4.2.1 Instrument Calibration

Initial and continuing calibration requirements were met for all analyses in all data packages.

4.2.2 Blanks

4.2.2.1 Method Blanks. Laboratory method blanks were analyzed at the proper frequency and results were reported and verified as undetected for all uranium analyses with the following exception:

Data Package W0107-ITC-104. Total Uranium.

Associated positive results with a sample concentration $< 5 \times$ blank concentration have been qualified as estimated (J).

4.2.2.2 Field Blanks. Samples B0BZM6 and B0BZM8 were identified as equipment blanks with the total uranium detected at 0.013 $\mu\text{g/L}$ and 0.02 $\mu\text{g/L}$, respectively.

Samples B0C2V6 AND B0C2W2 were identified as equipment blanks and the sample results were reported and verified as nondetects.

In accordance with the validation requirements, no qualification was required for field blank contamination.

4.2.3 Holding Times

Holding time requirements were met for all samples validated.

4.3 ANALYTICAL ACCURACY

4.3.1 Laboratory Control Samples

Laboratory control (blank spike) samples were analyzed at the required frequency with all results within control limits.

4.4 ANALYTICAL PRECISION

4.4.1 Laboratory Duplicates

Laboratory duplicate relative percent difference values were within required control limits for all data packages with the exception of the following:

Data Package W0109-ITC-097. Total Uranium.

In accordance with the validation procedures, sample results were qualified as estimated (J for detects, NJ for nondetects).

4.4.2 Field Duplicates

Five field duplicate samples were evaluated as part of this data set and results are shown in Appendix F. The results are within the evaluation criteria of 20% RPD or \pm RDL.

4.4.3 Field Splits

Four field split samples were evaluated as part of this data set and results are shown in Appendix F. The results are within the evaluation criteria of 20% RPD or \pm RDL with the exception of results for the following samples:

Data Package B0BZJ4-TMA-784. Samples B0BZJ4 and B0BZL8 were identified as field split samples. The associated relative percent differences exceed the 20% control limit for both samples.

In accordance with the data validation procedures, no qualification is required for field split samples.

4.5 SAMPLE RESULTS QUANTITATION, VERIFICATION AND REPORTED DETECTION LIMITS

All sample results were verified and confirmed against the raw data and correctly reported with the exception of total uranium results for samples B0BZM6 and B0BZM8. Validated results were properly calculated using the proper detectors, efficiencies and background counts. Minimum detectable activities (MDAs) were calculated properly to account for sample volumes and were consistent with method detection limit requirements.

4.6 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data and no indications of poor performance were noted.

5.0 REFERENCES

WHC 1993a, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993.
Westinghouse Hanford Company, Richland, Washington.

WHC 1993b, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1,
1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Validation of 300-FF-5 Data, Statement of Work, Environmental and Waste Characterization
Analytical Data Validation, MSH-SWV-315905, August 10, 1994, Westinghouse Hanford
Company, Richland, Washington.

APPENDIX A
VOLATILE ORGANIC VALIDATED DATA SUMMARY TABLES

A-1

	Samp# Date Location Depth Type Comments	BOBZJ2 6-24-94 3-1-5	BOBZJ4 6-24-94 3-1-5	BOBZJ8 6-23-94 3-1-7	BOBZK0 6-24-94 3-1-16C	BOBZK2 6-24-94 3-1-21A	BOBZK4 6-23-94 3-2-2
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
CHLOROMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BROMOMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
VINYL CHLORIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
METHYLENE CHLORIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
ACETONE	UG/L	10.000 U	4.000 J	10.000 U	10.000 U	10.000 U	10.000 U
CARBON DISULFIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1-DICHLOROETHENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1-DICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,2-DICHLOROETHENE (TOTAL)	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CHLOROFORM	UG/L	10.000 U	10.000 U	6.000 J	10.000 U	7.000 J	4.000 J
1,2-DICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
2-BUTANONE	UG/L	10.000 U	10.000 U	10.000 U	11.000 U	10.000 U	10.000 U
1,1,1-TRICHLOROETHANE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
CARBON TETRACHLORIDE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
BROMODICHLOROMETHANE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
1,2-DICHLOROPROPANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CIS-1,3-DICHLOROPROPENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TRICHLOROETHENE	UG/L	10.000 UJ	10.000 U	4.000 J	10.000 UJ	10.000 UJ	7.000 J
DIBROMOCHLOROMETHANE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
1,1,2-TRICHLOROETHANE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
BENZENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BROMOFORM	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
4-METHYL-2-PENTANONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
2-HEXANONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TETRACHLOROETHENE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
1,1,2,2-TETRACHLOROETHANE	UG/L	10.000 UJ	10.000 U	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ
TOLUENE	UG/L	10.000 UJ	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
CHLOROBENZENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
ETHYLBENZENE	UG/L	10.000 UJ	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
STYRENE	UG/L	10.000 UJ	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
XYLENES (TOTAL)	UG/L	10.000 UJ	10.000 U	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ

Verified
sgm 9/08/94

	Samp# Date Location Depth Type Comments	BOBZK8 6-22-94 3-3-2	BOBZL0 6-22-94 3-3-11	BOBZL2 6-22-94 3-3-11	DUPLICATE ---	BOBZL4 6-22-94 3-3-12	BOBZL6 6-23-94 3-4-7	BOBZL8 6-23-94 3-4-7
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
CHLOROMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BROMOMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
VINYL CHLORIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
METHYLENE CHLORIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
ACETONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	9.000 U
CARBON DISULFIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1-DICHLOROETHENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1-DICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,2-DICHLOROETHENE (TOTAL)	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CHLOROFORM	UG/L	10.000 U	2.000 J	2.000 J	2.000 J	2.000 J	3.000 J	3.000 J
1,2-DICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
2-BUTANONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1,1-TRICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CARBON TETRACHLORIDE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BROMODICHLOROMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,2-DICHLOROPROPANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
CIS-1,3-DICHLOROPROPENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TRICHLOROETHENE	UG/L	10.000 U	3.000 J	2.000 J	2.000 J	2.000 J	2.000 J	2.000 J
DIBROMOCHLOROMETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1,2-TRICHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BENZENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
BROMOFORM	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
4-METHYL-2-PENTANONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
2-HEXANONE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TETRACHLOROETHENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
TOLUENE	UG/L	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
CHLOROBENZENE	UG/L	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U	10.000 U
ETHYL BENZENE	UG/L	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
STYRENE	UG/L	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ
XYLENES (TOTAL)	UG/L	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ	10.000 UJ

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Parameter	Units	BOBZM0 6-23-94 3-4-10		BOBZM2 6-23-94 3-4-10		BOBZM4 6-22-94 3-4-12		BOBZM6 6-22-94 3-3-11		BOBZM8 6-22-94 3-3-12		BOBZNO 6-23-94 3-4-7	
		Result	Q	Result	Q								
CHLOROMETHANE	UG/L	10.000	U	10.000	U								
BROMOMETHANE	UG/L	10.000	U	10.000	U								
VINYL CHLORIDE	UG/L	10.000	U	10.000	U								
CHLOROETHANE	UG/L	10.000	U	10.000	U								
METHYLENE CHLORIDE	UG/L	10.000	U	10.000	U								
ACETONE	UG/L	10.000	U	10.000	U								
CARBON DISULFIDE	UG/L	10.000	U	10.000	U								
1,1-DICHLOROETHENE	UG/L	10.000	U	10.000	U								
1,1-DICHLOROETHANE	UG/L	10.000	U	10.000	U								
1,2-DICHLOROETHENE (TOTAL)	UG/L	10.000	U	10.000	U								
CHLOROFORM	UG/L	4.000	J	4.000	J	7.000	J	2.000	J	3.000	J	2.000	J
1,2-DICHLOROETHANE	UG/L	10.000	U	10.000	U								
2-BUTANONE	UG/L	10.000	U	10.000	U								
1,1,1-TRICHLOROETHANE	UG/L	10.000	UJ	10.000	UJ								
CARBON TETRACHLORIDE	UG/L	10.000	UJ	10.000	UJ								
BROMODICHLOROMETHANE	UG/L	10.000	UJ	10.000	UJ								
1,2-DICHLOROPROPANE	UG/L	10.000	U	10.000	U								
CIS-1,3-DICHLOROPROPENE	UG/L	10.000	U	10.000	U								
TRICHLOROETHENE	UG/L	10.000	UJ	1.000	J	7.000	J	10.000	U	10.000	U	10.000	U
DIBROMOCHLOROMETHANE	UG/L	10.000	UJ	10.000	UJ								
1,1,2-TRICHLOROETHANE	UG/L	10.000	UJ	10.000	UJ								
BENZENE	UG/L	10.000	U	10.000	U								
TRANS-1,3-DICHLOROPROPENE	UG/L	10.000	U	10.000	U								
BROMOFORM	UG/L	10.000	U	10.000	U								
4-METHYL-2-PENTANONE	UG/L	10.000	U	10.000	U								
2-HEXANONE	UG/L	10.000	U	10.000	U								
TETRACHLOROETHENE	UG/L	10.000	UJ	10.000	UJ								
1,1,2,2-TETRACHLOROETHANE	UG/L	10.000	UJ	10.000	UJ								
TOLUENE	UG/L	10.000	UJ	10.000	UJ								
CHLOROBENZENE	UG/L	10.000	U	10.000	U								
ETHYLBENZENE	UG/L	10.000	UJ	10.000	UJ								
STYRENE	UG/L	10.000	UJ	10.000	UJ								
XYLENES (TOTAL)	UG/L	10.000	UJ	10.000	UJ								

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Parameter	Units	BOBZN1 6-23-94 3-1-7		BOBZN2 6-22-94 3-3-11		BOBZN3 6-23-94 3-2-2		BOBZN4 6-24-94 3-1-5	
		Result	Q	Result	Q	Result	Q	Result	Q
CHLOROMETHANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
BROMOMETHANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
VINYL CHLORIDE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
CHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
METHYLENE CHLORIDE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
ACETONE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
CARBON DISULFIDE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
1,1-DICHLOROETHENE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
1,1-DICHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
1,2-DICHLOROETHENE (TOTAL)	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
CHLOROFORM	UG/L	1.000	J	10.000	U	10.000	U	10.000	U
1,2-DICHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
2-BUTANONE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
1,1,1-TRICHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
CARBON TETRACHLORIDE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
BROMODICHLOROMETHANE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
1,2-DICHLOROPROPANE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
CIS-1,3-DICHLOROPROPENE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
TRICHLOROETHENE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
DIBROMOCHLOROMETHANE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
1,1,2-TRICHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
BENZENE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
TRANS-1,3-DICHLOROPROPENE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
BROMOFORM	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
4-METHYL-2-PENTANONE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
2-HEXANONE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
TETRACHLOROETHENE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
1,1,2,2-TETRACHLOROETHANE	UG/L	10.000	U	10.000	U	10.000	UJ	10.000	UJ
TOLUENE	UG/L	10.000	UJ	10.000	UJ	10.000	UJ	10.000	UJ
CHLOROBENZENE	UG/L	10.000	U	10.000	U	10.000	U	10.000	U
ETHYLBENZENE	UG/L	10.000	UJ	10.000	UJ	10.000	UJ	10.000	UJ
STYRENE	UG/L	10.000	UJ	10.000	UJ	10.000	UJ	10.000	UJ
XYLENES (TOTAL)	UG/L	10.000	UJ	10.000	UJ	10.000	UJ	10.000	UJ

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APPENDIX B

VOLATILE ORGANIC FIELD DUPLICATE AND FIELD SPLIT SUMMARY

VOLATILE ORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-5

PAGE 1 OF 1

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SDG NO.: W0106-ITC-085			
SAMPLE ID: B0BZL0			
DUPLICATE SAMPLE ID: B0BZL2			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-3-11			
PARAMETER	B0BZL0 RESULT	B0BZL2 RESULT	RPD
CHLOROFORM	2	2	0
TRICHLOROETHENE	3	2	40
SDG NO.: W0107-ITC-104			
SAMPLE ID: B0BZM0			
DUPLICATE SAMPLE ID: B0BZM2			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-4-10			
PARAMETER	B0BZM0 RESULT	B0BZM2 RESULT	RPD
CHLOROFORM	4	4	0
TRICHLOROETHENE	ND	1	200

SDG NO.: B0BZJ4-TMA-784			
SAMPLE ID: B0BZJ2 FROM SDG W0107-ITC-104			
FIELD SPLIT SAMPLE ID: B0BZJ4			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-1-5			
PARAMETER	B0BZJ2 RESULT	B0BZJ4 RESULT	RPD
ACETONE	ND	4	200
SDG NO.: B0BZJ4-TMA-784			
SAMPLE ID: B0BZL8 FROM SDG W0107-ITC-104			
FIELD SPLIT SAMPLE ID: B0BZL8			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-4-7			
PARAMETER	B0BZL8 RESULT	B0BZL8 RESULT	RPD
ACETONE	ND	9	200
CHLOROFORM	3	3	0
TRICHLOROETHENE	2	2	0

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APPENDIX C

METALS VALIDATED DATA SUMMARY TABLES

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Parameter	Samp#	BOBZJ2	BOBZJ3	BOBZJ4	BOBZJ5	BOBZJ6	BOBZJ7				
	Date	6-24-94	6-24-94	6-24-94	6-24-94	6-24-94	6-24-94				
Location	3-1-5	3-1-5	3-1-5	3-1-5	3-1-5	3-1-5	3-1-5				
Depth	---	---	---	---	---	---	---				
Type	GROUNDWATER	GROUNDWATER	SPLIT	SPLIT	DUPLICATE	DUPLICATE	DUPLICATE				
Comments	---	FILTERED	---	FILTERED	---	---	FILTERED				
Units	Result	Q	Result	Q	Result	Q	Result				
ALUMINUM	UG/L	19.000	UJ	19.000	UJ	38.400	U	19.000	UJ	19.000	UJ
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	16.100	U	19.500	UJ	19.500	UJ
BARIUM	UG/L	38.800	B	39.300	B	42.100	U	37.700	B	38.000	B
BERYLLIUM	UG/L	0.800	U	0.800	U	0.600	U	0.800	U	0.600	U
CADMIUM	UG/L	1.800	UJ	1.800	UJ	0.800	U	1.800	UJ	1.800	UJ
CALCIUM	UG/L	52600.000		55500.000		49000.000		49200.000		54700.000	
CHROMIUM	UG/L	2.900	BJ	2.800	UJ	8.400	U	3.700	U	4.500	BJ
COBALT	UG/L	2.900	UJ	2.900	UJ	2.300	U	2.300	U	2.900	UJ
COPPER	UG/L	4.500	UJ	4.500	UJ	2.500	U	2.500	U	4.500	UJ
IRON	UG/L	34.200	U	106.000		49.600	U	74.300	U	48.200	U
MAGNESIUM	UG/L	11000.000		11100.000		10100.000		10200.000		10900.000	
MANGANESE	UG/L	1.400	UJ	1.200	BJ	1.600	U	0.700	U	1.400	BJ
NICKEL	UG/L	4.900	UJ	4.900	UJ	7.900	U	7.900	U	4.900	UJ
POTASSIUM	UG/L	3040.000	B	3120.000	B	2650.000	B	2590.000	B	3060.000	B
SILVER	UG/L	4.200	UJ	4.200	UJ	3.700	U	3.700	U	4.200	UJ
SODIUM	UG/L	23300.000		24000.000		21600.000		21700.000		23300.000	
VANADIUM	UG/L	9.800	UJ	9.800	UJ	3.500	B	2.500	U	9.800	UJ
ZINC	UG/L	4.000	U	8.500	B	3.200	U	12.000	U	18.600	B

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	Samp# Date Location Depth Type Comments	BOBZJ8 6-23-94 3-1-7	BOBZJ9 6-23-94 3-1-7	BOBZK0 6-24-94 3-1-16C	BOBZK1 6-24-94 3-1-16C	BOBZK2 6-24-94 3-1-21A	BOBZK3 6-24-94 3-1-21A
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
ALUMINUM	UG/L	34.500 U	34.500 U	113.000 UJ	36.200 UJ	19.000 UJ	19.000 UJ
ANTIMONY	UG/L	30.500 U	30.500 U	19.500 UJ	19.500 UJ	19.500 UJ	19.500 UJ
BARIUM	UG/L	26.300 B	27.400 B	70.400 B	68.900 B	34.700 B	33.700 B
BERYLLIUM	UG/L	0.400 U	0.400 U	0.600 U	0.800 U	0.800 U	0.800 U
CADMIUM	UG/L	2.200 U	2.200 U	1.800 UJ	1.800 UJ	1.800 UJ	1.800 UJ
CALCIUM	UG/L	32200.000	32700.000	12400.000	11900.000	40400.000	39700.000
CHROMIUM	UG/L	3.000 UJ	3.000 UJ	5.800 BJ	2.800 UJ	2.800 UJ	2.800 UJ
COBALT	UG/L	3.200 UJ	3.200 UJ	2.900 UJ	2.900 UJ	2.900 UJ	2.900 UJ
COPPER	UG/L	2.100 UJ	2.100 UJ	4.500 UJ	4.500 UJ	4.500 UJ	4.500 UJ
IRON	UG/L	22.900 U	24.900 U	271.000	64.800 U	54.600 U	54.600 U
MAGNESIUM	UG/L	6240.000	6340.000	4930.000 B	4770.000 B	8190.000	8110.000
MANGANESE	UG/L	0.600 UJ	0.600 UJ	40.800	35.300	2.800 U	1.500 U
NICKEL	UG/L	11.400 U	11.400 U	4.900 UJ	4.900 UJ	4.900 UJ	4.900 UJ
POTASSIUM	UG/L	2900.000 B	2890.000 B	9890.000	9750.000	4850.000 B	4850.000 B
SILVER	UG/L	3.000 UJ	3.000 UJ	4.200 UJ	4.200 UJ	4.200 UJ	4.200 UJ
SODIUM	UG/L	31600.000	31900.000	67800.000	67100.000	22700.000	22600.000
VANADIUM	UG/L	1.900 UJ	1.900 UJ	9.800 UJ	9.800 UJ	9.800 UJ	9.800 UJ
ZINC	UG/L	3.800 U	3.800 U	27.200	4.500 U	1.400 UJ	4.600 U

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Parameter	Units	BOBZK4 6-23-94 3-2-2		BOBZK5 6-23-94 3-2-2		BOBZK6 6-23-94 3-2-2		BOBZK7 6-23-94 3-2-2		BOBZK8 6-22-94 3-3-2		BOBZK9 6-22-94 3-3-2	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	19.000	UJ	19.000	UJ	34.500	U	34.500	U	34.500	U	34.500	U
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	30.500	U	30.500	U	30.500	U	30.500	U
BARIUM	UG/L	44.800	B	43.800	B	45.800	B	45.100	B	42.000	B	40.500	B
BERYLLIUM	UG/L	0.800	U	0.800	U	0.800	U	0.600	U	0.470	U	0.460	U
CADMIUM	UG/L	1.800	UJ	1.800	UJ	2.200	U	2.200	U	2.200	U	2.200	U
CALCIUM	UG/L	44400.000		43800.000		44900.000		44300.000		49500.000		48100.000	
CHROMIUM	UG/L	2.800	UJ	2.800	UJ	5.000	BJ	3.000	UJ	4.800	B	4.500	B
COBALT	UG/L	2.900	UJ	2.900	UJ	3.200	UJ	3.200	UJ	3.200	U	3.200	U
COPPER	UG/L	4.500	UJ	4.500	UJ	2.100	UJ	2.100	UJ	8.600	U	6.400	U
IRON	UG/L	43.100	U	10.400	U	111.000	U	32.400	U	542.000		17.800	
MAGNESIUM	UG/L	8210.000		8080.000		8330.000		8260.000		10500.000		10300.000	
MANGANESE	UG/L	1.500	B	0.970	BJ	2.100	B	0.770	BJ	5.900	B	2.800	U
NICKEL	UG/L	4.900	UJ	4.900	UJ	11.400	U	11.400	U	11.400	U	11.400	U
POTASSIUM	UG/L	3610.000	B	3550.000	B	3660.000	B	3500.000	B	6210.000		5990.000	
SILVER	UG/L	4.200	UJ	6.000	UJ	3.000	UJ	3.000	UJ	3.000	U	3.000	U
SODIUM	UG/L	2650.000		26100.000		26400.000		26600.000		18100.000		17900.000	
VANADIUM	UG/L	9.800	UJ	9.800	UJ	1.900	UJ	1.900	UJ	17.600	U	14.900	U
ZINC	UG/L	12.500	B	1.400	UJ	14.700	B	6.500	B	8.300	B	6.200	B

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	Samp#	BOBZL0	BOBZL1	BOBZL2	BOBZL3	BOBZL4	BOBZL5
	Date Location Depth Type Comments	6-22-94 3-3-11 ---	6-22-94 3-3-11 ---	6-22-94 3-3-11 ---	6-22-94 3-3-11 ---	6-22-94 3-3-12 ---	6-22-94 3-3-12 ---
Parameter	Units	Result Q					
ALUMINUM	UG/L	34.500 U					
ANTIMONY	UG/L	30.500 U	37.700 B				
BARIUM	UG/L	44.200 B	45.600 B	44.200 B	45.100 B	46.200 B	45.900 B
BERYLLIUM	UG/L	0.460 U	0.470 U	0.470 U	0.300 U	0.470 U	0.200 U
CADMIUM	UG/L	2.200 U					
CALCIUM	UG/L	47800.000	49400.000	47900.000	48400.000	49400.000	49500.000
CHROMIUM	UG/L	7.200 B	3.400 B	7.100 B	3.000 U	5.300 B	3.000 U
COBALT	UG/L	3.200 U					
COPPER	UG/L	10.700 U	7.300 U	8.000 U	7.300 U	8.500 U	4.300 U
IRON	UG/L	73.200 U	36.800 U	52.800 U	31.300 U	134.000	22.900 U
MAGNESIUM	UG/L	10000.000	10300.000	9980.000	10100.000	10400.000	10400.000
MANGANESE	UG/L	2.600 U	2.600 U	2.700 U	2.000 U	7.200 B	3.500 B
NICKEL	UG/L	11.400 U	11.400 B				
POTASSIUM	UG/L	4730.000 B	5700.000	3870.000 B	5780.000	6350.000	4530.000
SILVER	UG/L	3.000 U					
SODIUM	UG/L	20300.000	20900.000	20200.000	20500.000	22500.000	23000.000
VANADIUM	UG/L	14.400 U	14.700 U	15.400 U	14.000 U	16.000 U	11.500 U
ZINC	UG/L	9.400 B	31.900	9.300 B	4.800 B	65.100	6.300 B

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Parameter	Samp#	BOBZL6	BOBZL7	BOBZL8	BOBZL9	BOBZM0	BOBZM1
	Date	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94
Location	3-4-7	3-4-7	3-4-7	3-4-7	3-4-7	3-4-10	3-4-10
Depth	---	---	---	---	---	---	---
Type	GROUNDWATER	GROUNDWATER	SPLIT	SPLIT	GROUNDWATER	GROUNDWATER	GROUNDWATER
Comments	---	FILTERED	---	FILTERED	---	---	FILTERED
Parameter	Units	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	19.000	UJ	19.000	UJ	23.800	U
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	16.100	U
BARIUM	UG/L	44.800	B	43.600	B	48.700	B
BERYLLIUM	UG/L	0.800	U	0.400	U	0.600	U
CADMIUM	UG/L	1.800	UJ	1.800	UJ	0.850	U
CALCIUM	UG/L	49200.000		50200.000		44000.000	
CHROMIUM	UG/L	2.800	UJ	2.800	UJ	3.700	U
COBALT	UG/L	2.900	UJ	2.900	UJ	2.300	U
COPPER	UG/L	4.500	UJ	4.500	UJ	2.500	U
IRON	UG/L	928.000		32.400	U	1190.000	
MAGNESIUM	UG/L	9070.000		9290.000		8450.000	
MANGANESE	UG/L	31.200		1.800	B	42.500	
NICKEL	UG/L	4.900	UJ	4.900	UJ	7.900	U
POTASSIUM	UG/L	5160.000		5290.000		4530.000	B
SILVER	UG/L	4.200	UJ	4.200	UJ	3.700	U
SODIUM	UG/L	19000.000		19400.000		17600.000	
VANADIUM	UG/L	9.800	UJ	9.800	UJ	7.000	B
ZINC	UG/L	10.900	B	7.200	U	15.700	U

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sgm 9/22/94

Parameter	Samp#	BOBZM2		BOBZM3		BOBZM4		BOBZM5		BOBZM6		BOBZM7	
	Date Location Depth Type Comments	6-23-94 3-4-10 ---	DUPLICATE ---	6-23-94 3-4-10 ---	DUPLICATE FILTERED	6-22-94 3-4-12 ---	GROUNDWATER ---	6-22-94 3-4-12 ---	GROUNDWATER FILTERED	6-22-94 3-3-11 ---	EQUIP BLANK ---	6-22-94 3-3-11 ---	EQUIP BLANK FILTERED
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	19.000	UJ	19.000	UJ	34.500	U	34.500	U	34.500	U	34.500	U
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	30.500	U	33.700	B	30.500	U	30.500	U
BARIUM	UG/L	53.400	B	53.700	B	39.600	B	40.200	B	0.700	U	0.700	U
BERYLLIUM	UG/L	0.800	U	0.800	U	0.320	U	0.470	U	0.310	U	0.310	U
CADMIUM	UG/L	1.800	UJ	1.800	UJ	2.200	U	2.200	U	2.200	U	2.200	U
CALCIUM	UG/L	45300.000		46300.000		46200.000		46300.000		36.600		82.300	
CHROMIUM	UG/L	2.800	UJ	2.800	UJ	4.200	B	3.000	U	3.000	U	3.000	U
COBALT	UG/L	2.900	UJ	2.900	UJ	3.200	U	3.200	U	3.200	U	3.200	U
COPPER	UG/L	4.500	UJ	4.500	UJ	8.800	U	8.800	U	6.100	U	6.800	U
IRON	UG/L	30.900	U	29.300	U	22.300	U	22.200	U	17.600	U	29.000	U
MAGNESIUM	UG/L	8320.000		8430.000		9230.000		9200.000		59.200		125.000	
MANGANESE	UG/L	1.500	B	2.100	B	1.500	U	2.000	U	0.660	U	0.650	U
NICKEL	UG/L	4.900	UJ	4.900	UJ	11.400	U	11.400	U	11.400	U	11.400	U
POTASSIUM	UG/L	4890.000	B	4940.000	B	5990.000		3920.000	B	2710.000		2710.000	
SILVER	UG/L	4.200	UJ	4.200	UJ	3.000	U	3.000	U	3.000	U	3.000	U
SODIUM	UG/L	18500.000		18800.000		17300.000		17200.000		54.300		110.000	
VANADIUM	UG/L	9.800	UJ	9.800	UJ	14.000	U	16.200	U	2.200	U	5.300	U
ZINC	UG/L	3.100	U	1.600	UJ	13.300	B	13.000	B	7.400	B	6.600	B

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Parameter	Units	B0BZM8		B0BZM9		BOC2R4		BOC2R5		BOC2R7		BOC2R8	
		Date 6-22-94	Location 3-3-12	Date 6-22-94	Location 3-3-12	Depth 0.00 - 3.17	Type WATER	Depth 0.00 - 3.17	Type WATER	Depth 0.00 - 4.75	Type WATER	Depth 0.00 - 4.75	Type WATER
ALUMINUM	UG/L	34.500	U	34.500	U	46.600	U	19.000	U	29.000	U	19.000	U
ANTIMONY	UG/L	30.500	U	30.500	U	19.500	UJ	19.500	U	19.500	U	19.500	U
BARIUM	UG/L	0.700	U	0.700	U	29.400	B	26.600	B	33.400	B	26.000	B
BERYLLIUM	UG/L	0.310	U	0.200	U	0.300	U	0.520	U	0.300	U	0.300	U
CADMIUM	UG/L	2.200	U	2.200	U	1.800	U	1.800	U	1.800	U	1.800	U
CALCIUM	UG/L	56.300	U	42.100	U	19800.000		18500.000		19500.000		18300.000	
CHROMIUM	UG/L	3.000	B	3.000	U	2.800	U	2.800	U	2.800	U	2.800	U
COBALT	UG/L	3.200	U	3.200	U	2.900	U	2.900	U	2.900	U	2.900	U
COPPER	UG/L	5.600	U	4.700	U	4.500	U	4.500	U	4.500	U	4.500	U
IRON	UG/L	12.900	U	10.600	U	106.000		18.200	U	103.000	U	12.400	U
MAGNESIUM	UG/L	112.000	U	36.000	U	4460.000	B	4160.000	B	4360.000	B	4160.000	B
MANGANESE	UG/L	0.650	U	0.600	U	9.400	U	3.800	U	9.100	B	3.000	U
NICKEL	UG/L	11.400	U	11.400	U	4.900	U	4.900	U	4.900	U	4.900	U
POTASSIUM	UG/L	2710.000	U	2710.000	U	1010.000	U	999.000	U	1010.000	U	948.000	U
SILVER	UG/L	3.000	U	3.000	U	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ
SODIUM	UG/L	80.500	U	40.200	U	2530.000	B	2240.000	B	2510.000	B	2190.000	B
VANADIUM	UG/L	4.400	U	1.900	U	9.800	U	9.800	U	9.800	U	9.800	U
ZINC	UG/L	11.200	B	6.200	B	14.400	U	6.100	U	10.800	U	3.500	U

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	Samp#	BOC2S0	BOC2S1	BOC2S3	BOC2S4	BOC2S5	BOC2S6
	Date	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94
	Location	SPRING 6,20 ft	SPRING 6,20 ft	SPRING 9,3 ft	SPRING 9,3 ft	SPRING 9,3 ft	SPRING 9,3 ft
	Depth	0.00 - 6.33	0.00 - 6.33	0.00 - 2.25	0.00 - 2.25	0.00 - 2.25	0.00 - 2.25
	Type	WATER	WATER	WATER	DUPPLICATE	WATER	DUPPLICATE
	Comments	---	FILTERED	---	---	FILTERED	FILTERED
Parameter	Units	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	1120.000		19.000	U	67.700	U
ANTIMONY	UG/L	19.500	U	19.500	U	19.500	U
BARIUM	UG/L	47.400	B	26.800	B	28.400	B
BERYLLIUM	UG/L	0.300	U	0.300	U	0.300	U
CADMIUM	UG/L	1.800	U	1.800	U	1.800	U
CALCIUM	UG/L	21000.000		18500.000		19200.000	
CHROMIUM	UG/L	2.800	U	2.800	U	2.800	U
COBALT	UG/L	2.900	U	2.900	U	29.000	U
COPPER	UG/L	4.500	U	4.500	U	4.500	U
IRON	UG/L	1860.000		21.100	U	86.000	U
MAGNESIUM	UG/L	4960.000	B	4210.000	B	4460.000	B
MANGANESE	UG/L	77.800		3.800	U	8.700	B
NICKEL	UG/L	4.900	U	4.900	U	4.900	UJ
POTASSIUM	UG/L	1320.000	U	1090.000	U	1060.000	U
SILVER	UG/L	4.200	UJ	4.200	UJ	4.200	UJ
SODIUM	UG/L	2600.000	B	2190.000	B	2490.000	B
VANADIUM	UG/L	9.800	U	9.800	U	9.800	U
ZINC	UG/L	75.000		3.000	U	21.200	U

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C.9

Parameter	Samp#	BOC2S8		BOC2S9		BOC2T0		BOC2T1		BOC2T3		BOC2T4																											
	Date	6-23-94	Location	SPRING 9,10 ft	Depth	0.00 - 3.75	Type	WATER	Comments	---	6-23-94	SPRING 9,10 ft	0.00 - 3.75	WATER	DUPLICATE	---	6-23-94	SPRING 9,10 ft	0.00 - 4.67	WATER	DUPLICATE	---	6-23-94	SPRING 9,20 ft	0.00 - 4.67	WATER	---	6-23-94	SPRING 9,20 ft	0.00 - 4.67	WATER	DUPLICATED	---						
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q						
ALUMINUM	UG/L	68.000	B	45.400	B	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U	19.000	U						
ANTIMONY	UG/L	32.700	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U	19.500	U						
BARIUM	UG/L	29.900	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B	27.800	B						
BERYLLIUM	UG/L	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U	0.300	U						
CADMIUM	UG/L	2.000	B	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U	1.800	U				
CALCIUM	UG/L	20100.000		19400.000		19000.000		18200.000		18200.000		19200.000		18100.000																									
CHROMIUM	UG/L	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U	2.800	U				
COBALT	UG/L	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U	29.000	U				
COPPER	UG/L	7.200	B	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U	4.500	U				
IRON	UG/L	78.200	U	55.300	U	14.200	U	15.200	U	84.700	U	11.100	U																										
MAGNESIUM	UG/L	4580.000	B	4460.000	B	4370.000	B	4210.000	B	4280.000	B	4160.000	B																										
MANGANESE	UG/L	9.500	B	8.300	B	3.000	U	2.700	U	8.600	U	2.400	U																										
NICKEL	UG/L	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ	4.900	UJ				
POTASSIUM	UG/L	1120.000	U	955.000	U	1050.000	U	869.000	U	934.000	U	941.000	U																										
SILVER	UG/L	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ	4.200	UJ				
SODIUM	UG/L	2430.000	B	2380.000	B	2430.000	B	2400.000	B	2410.000	B	2270.000	B																										
VANADIUM	UG/L	12.500	B	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U				
ZINC	UG/L	7.200	U	10.400	U	5.300	U	8.300	U	17.400	U	3.600	U																										

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	Samp#	BOC2T6	BOC2T7	BOC2T8	BOC2T9	BOC2V1	BOC2V2
	Date	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94	6-23-94
Location	SPRING 11,3 ft	SPRING 11,3 ft	SPRING 11,3 ft	SPRING 11,3 ft	SPRING 11,10 ft	SPRING 11,10 ft	
Depth	0.00 - 2.00		0.00 - 2.00		0.00 - 2.00		0.00 - 5.00
Type	WATER		DUPLICATE		WATER		WATER
Comments	---		---		FILTERED		FILTERED
Parameter	Units	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	49.300	U	19.000	U	19.000	U
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	19.500	UJ
BARIUM	UG/L	27.700	B	27.900	B	29.600	B
BERYLLIUM	UG/L	0.300	U	0.300	U	0.300	U
CADMIUM	UG/L	1.800	U	1.800	U	1.800	U
CALCIUM	UG/L	18400.000		18400.000		18800.000	
CHROMIUM	UG/L	2.800	UJ	2.800	UJ	2.800	UJ
COBALT	UG/L	2.900	U	2.900	U	2.900	U
COPPER	UG/L	4.500	U	4.500	U	4.500	U
IRON	UG/L	67.800	U	61.000	U	18.800	U
MAGNESIUM	UG/L	4190.000	B	4210.000	B	4340.000	B
MANGANESE	UG/L	7.600	U	7.200	U	2.500	U
NICKEL	UG/L	4.900	U	12.500	B	4.900	U
POTASSIUM	UG/L	919.000	U	963.000	U	919.000	U
SILVER	UG/L	4.200	UJ	4.200	UJ	4.200	UJ
SODIUM	UG/L	2220.000	B	2360.000	B	2320.000	B
VANADIUM	UG/L	9.800	U	9.800	U	9.800	U
ZINC	UG/L	11.500	U	9.000	U	8.200	U
						11.000	U
						12.400	U
						6.900	U

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C-11

	Samp#	B0C2V4		B0C2V5		B0C2V6		B0C2V7		B0C2V8		B0C2V9	
	Date	6-23-94	SPRING 11,20 ft	6-23-94	SPRING 11,20 ft	6-23-94	SPRING 11	6-23-94	SPRING 6,3 ft	6-23-94	SPRING 6,3 ft	6-23-94	
Location		0.00 - 5.50	WATER	0.00 - 5.50	WATER	---	EQUIP BLANK	0.00 - 3.17	SPLIT	0.00 - 3.17	SPLIT	SPRING 11	
Type		---		---	FILTERED		---	---	---	FILTERED		---	
Comments													
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	37.800	U	19.000	U	19.000	U	93.600	U	31.400	BJ	19.000	U
ANTIMONY	UG/L	19.500	UJ	19.500	UJ	19.500	UJ	16.100	U	16.100	U	19.500	UJ
BARIUM	UG/L	28.500	B	26.600	B	1.300	U	34.000	U	31.900	U	1.300	U
BERYLLIUM	UG/L	0.300	U	0.300	U	0.300	U	0.600	U	0.600	U	0.300	U
CADMIUM	UG/L	1.800	U	1.800	U	1.800	U	0.800	U	0.800	U	1.800	U
CALCIUM	UG/L	19800.000		17900.000		86.400	U	16600.000		16500.000		82.100	
CHROMIUM	UG/L	2.800	U	2.800	U	2.800	U	3.700	U	3.700	UJ	2.800	U
COBALT	UG/L	2.900	U	2.900	U	2.900	U	2.300	U	2.300	U	2.900	U
COPPER	UG/L	4.500	U	4.500	U	4.500	U	2.500	U	2.500	U	7.300	U
IRON	UG/L	83.600	B	22.400	U	8.600	U	96.000	BJ	15.000	UJ	13.200	U
MAGNESIUM	UG/L	4470.000	B	4110.000	B	24.700	U	3870.000	B	3860.000	BJ	41.400	U
MANGANESE	UG/L	8.800	U	2.700	U	1.300	U	7.200	BJ	0.700	U	1.400	U
NICKEL	UG/L	4.900	U	4.900	U	4.900	U	7.900	U	7.900	U	4.900	U
POTASSIUM	UG/L	1050.000	U	963.000	U	347.000	U	769.000	B	617.000	B	297.000	U
SILVER	UG/L	4.200	UJ	4.200	UJ	4.200	UJ	3.700	U	3.700	U	4.200	UJ
SODIUM	UG/L	2620.000	B	2350.000	B	66.100	U	2150.000	B	2100.000	BJ	84.800	U
VANADIUM	UG/L	9.800	U	9.800	U	9.800	U	2.500	U	2.500	U	9.800	U
ZINC	UG/L	17.800	B	8.000	U	6.000	U	5.600	U	3.200	U	31.900	U

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Parameter	Units	BOC2W0		BOC2W1		BOC2W2		BOC2W3	
		Date 6-23-94	Location SPRING 11, 10 ft	Date 6-23-94	Location SPRING 11, 10 ft	Date 6-23-94	Location SPRING 11	Date 6-23-94	Location SPRING 11
ALUMINUM	UG/L	91.600	U	23.800	U	19.000	U	19.000	U
ANTIMONY	UG/L	16.100	U	16.100	U	19.500	UJ	19.500	UJ
BARIUM	UG/L	34.000	U	31.900	U	1.300	U	1.300	U
BERYLLIUM	UG/L	0.600	U	0.600	U	0.300	U	0.300	U
CADMIUM	UG/L	0.800	U	0.800	U	1.800	U	1.800	U
CALCIUM	UG/L	17000.000		16200.000		51.000	U	53.100	U
CHROMIUM	UG/L	3.700	U	3.700	UJ	2.800	U	2.800	U
COBALT	UG/L	2.300	U	2.300	U	2.900	U	2.900	U
COPPER	UG/L	2.500	U	2.500	U	4.500	U	4.500	U
IRON	UG/L	105.000	J	15.000	UJ	8.000	U	10.400	U
MAGNESIUM	UG/L	3860.000	B	3830.000	BJ	24.700	U	24.700	U
MANGANESE	UG/L	6.200	BJ	0.700	U	1.400	U	1.100	U
NICKEL	UG/L	7.900	U	7.900	U	4.900	U	4.900	U
POTASSIUM	UG/L	700.000	B	711.000	B	311.000	U	297.000	U
SILVER	UG/L	3.700	U	3.700	U	4.200	UJ	4.200	UJ
SODIUM	UG/L	2210.000	B	2110.000	BJ	50.300	U	53.700	U
VANADIUM	UG/L	2.500	U	2.500	U	9.800	U	9.800	U
ZINC	UG/L	4.300	U	3.200	U	8.000	U	3.800	U

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APPENDIX D

METALS VALIDATED FIELD DUPLICATE AND FIELD SPLIT SUMMARY

INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-6

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SDG NO.: W0106-ITC-095									
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-2-2									
SAMPLE ID: B0BZK4 FROM SDG W0107-ITC-104 DUPLICATE SAMPLE ID: B0BZK6					SAMPLE ID: B0BZK6 FROM SDG W0107-ITC-104 DUPLICATE SAMPLE ID: B0BZK7				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER		B0BZK4	B0BZK6		PARAMETER		B0BZK6	B0BZK7	
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
BARIUM	200	44.8	45.8	2	BARIUM	200	43.8	45.1	3
CALCIUM	5000	44400	44900	1	CALCIUM	5000	43800	44300	1
CHROMIUM	10	ND	5	200	MAGNESIUM	5000	8080	8260	2
MAGNESIUM	5000	8210	8330	1	MANGANESE	15	0.97	0.77	23
MANGANESE	15	1.5	2.1	33	POTASSIUM	5000	3550	3500	1
POTASSIUM	5000	3610	3660	1	SODIUM	5000	26100	26600	2
SODIUM	5000	26500	26400	0	ZINC	20	ND	6.5	200
ZINC	20	12.6	14.7	18					
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-3-11									
SAMPLE ID: B0BZL0 DUPLICATE SAMPLE ID: B0BZL2					SAMPLE ID: B0BZL1 DUPLICATE SAMPLE ID: B0BZL3				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER		B0BZL0	B0BZL2		PARAMETER		B0BZL1	B0BZL3	
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
BARIUM	200	44.2	44.2	0	BARIUM	200	45.8	45.1	1
CALCIUM	5000	47800	47900	0	CALCIUM	5000	49400	48400	2
CHROMIUM	10	7.2	7.1	1	CHROMIUM	10	3.4	ND	200
MAGNESIUM	5000	10000	9980	0	MAGNESIUM	5000	10300	10100	2
POTASSIUM	5000	4730	3870	20	POTASSIUM	5000	5700	5780	1
SODIUM	5000	20300	20200	0	SODIUM	5000	20900	20500	2
ZINC	20	9.4	9.3	1	ZINC	20	31.8	4.8	148

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INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-6

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SDG NO.: W0107-ITC-104									
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-1-5									
SAMPLE ID: B0BZJ2 FIELD DUPLICATE SAMPLE ID: B0BZJ6				SAMPLE ID: B0BZJ3 FIELD DUPLICATE SAMPLE ID: B0BZJ7					
MEDIA: WATER				MEDIA: FILTERED WATER					
PARAMETER		B0BZJ2	B0BZJ6		PARAMETER	B0BZJ3	B0BZJ7		
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
BARIUM	200	38.8	37.7	3	BARIUM	200	39.3	38	3
CALCIUM	5000	52600	54700	4	CALCIUM	5000	55500	55000	1
CHROMIUM	10	2.9	4.5	43	IRON	100	106	ND	200
MAGNESIUM	5000	11000	10900	1	MAGNESIUM	5000	11100	10900	2
MANGANESE	15	ND	1.4	200	MANGANESE	15	1.2	1.4	15
POTASSIUM	5000	3040	3080	1	POTASSIUM	5000	3120	3110	0
SODIUM	5000	23300	23300	0	SODIUM	5000	24000	23800	2
ZINC	20	ND	18.6	200	ZINC	20	8.5	8.7	2
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-4-10									
SAMPLE ID: B0BZM0 FIELD DUPLICATE SAMPLE ID: B0BZM2				SAMPLE ID: B0BZM1 FIELD DUPLICATE SAMPLE ID: B0BZM3					
MEDIA: WATER				MEDIA: FILTERED WATER					
PARAMETER		B0BZM0	B0BZM2		PARAMETER	B0BZM1	B0BZM3		
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
BARIUM	200	53.2	53.4	0	BARIUM	200	52.2	53.7	3
CALCIUM	5000	45300	45300	0	CALCIUM	5000	45500	46300	2
MAGNESIUM	5000	8350	8320	0	MAGNESIUM	5000	8300	8430	2
MANGANESE	15	1.5	1.5	0	MANGANESE	15	1.8	2.1	10
POTASSIUM	5000	4840	4890	1	POTASSIUM	5000	4850	4940	2
SODIUM	5000	18600	18500	1	SODIUM	5000	18500	18800	2

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INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-8

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SDG NO.: W0109-ITC-097									
SAMPLE LOCATION: SPRING #11, SITE 3 FT.									
SAMPLE ID: B0C2T8 DUPLICATE SAMPLE ID: B0C2T7			SAMPLE ID: B0C2T8 DUPLICATE SAMPLE ID: B0C2T9						
MEDIA: WATER			MEDIA: FILTERED WATER						
PARAMETER	CRDL	B0C2T8 RESULT	B0C2T7 RESULT	RPD	PARAMETER	CRDL	B0C2T8 RESULT	B0C2T9 RESULT	RPD
BARIUM	200	27.7	27.9	1	BARIUM	200	29.6	33	11
CALCIUM	5000	18400	18400	0	CALCIUM	5000	18800	18400	2
MAGNESIUM	5000	4190	4210	0	MAGNESIUM	5000	4340	4240	2
NICKEL	40	ND	12.5	200	SODIUM	5000	2320	2440	5
SODIUM	5000	2220	2360	6					

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INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-5

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SDG NO.: W0110-ITC-103									
SAMPLE LOCATION: SPRING #9, SITE 3 FT., BOTTOM DEPTH									
SAMPLE ID: B0C2S3 DUPLICATE SAMPLE ID: B0C2S4					SAMPLE ID: B0C2S5 DUPLICATE SAMPLE ID: B0C2S6				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER		B0C2S3	B0C2S4		PARAMETER		B0C2S5	B0C2S6	
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
BARIUM	200	28.4	27.8	2	BARIUM	200	28.4	27	5
CALCIUM	5000	19200	19300	1	CALCIUM	5000	20700	18700	10
MAGNESIUM	5000	4460	4470	0	MAGNESIUM	5000	4740	4330	9
MANGANESE	15	8.7	8.7	0	POTASSIUM	5000	1340	ND	200
SODIUM	5000	2490	2520	1	SODIUM	5000	2630	2370	10
					VANADIUM	50	ND	10.4	200
SAMPLE LOCATION: SPRING #9, SITE 10 FT. BOTTOM DEPTH									
SAMPLE ID: B0C2S8 DUPLICATE SAMPLE ID: B0C2S9					SAMPLE ID: B0C2T0 DUPLICATE SAMPLE ID: B0C2T1				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER		B0C2S8	B0C2S9		PARAMETER		B0C2T0	B0C2T1	
	CRDL	RESULT	RESULT	RPD		CRDL	RESULT	RESULT	RPD
ALUMINUM	200	68	45.4	40	BARIUM	200	27.8	27	3
BARIUM	200	29.9	27.8	7	CALCIUM	5000	19000	18200	4
CADMIUM	5	2	ND	200	MAGNESIUM	5000	4370	4210	4
CALCIUM	5000	20100	19400	4	SODIUM	5000	2430	2400	1
COPPER	25	7.2	ND	200					
MAGNESIUM	5000	4580	4460	3					
MANGANESE	15	9.5	8.3	13					
SODIUM	5000	2430	2380	2					
VANADIUM	50	12.5	ND	200					

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INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-6

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SDG NO.: B0BZJ4-TMA-784									
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-1-5									
SAMPLE ID: B0BZJ2 FROM SDG W0107-ITC-104 FIELD SPLIT SAMPLE ID: B0BZJ4					SAMPLE ID: B0BZJ3 FROM SDG W0107-ITC-104 FIELD SPLIT SAMPLE ID: B0BZJ5				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER	CRDL	B0BZJ2 RESULT	B0BZJ4 RESULT	RPD	PARAMETER	CRDL	B0BZJ3 RESULT	B0BZJ5 RESULT	RPD
BARIUM	200	38.8	ND	200	BARIUM	200	39.3	42.1	7
CALCIUM	5000	52600	49000	7	CALCIUM	5000	55500	49200	12
CHROMIUM	10	2.9	ND	200	IRON	100	106	ND	200
MAGNESIUM	5000	11000	10100	9	MAGNESIUM	5000	11000	10200	8
MANGANESE	15	1.4	ND	200	MANGANESE	15	1.2	ND	200
POTASSIUM	5000	3040	2650	14	POTASSIUM	5000	3120	2580	19
SODIUM	5000	23300	21600	8	SODIUM	5000	24000	21700	10
VANADIUM	50	ND	3.5	200	ZINC	20	8.5	ND	200
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-4-7									
SAMPLE ID: B0BZL6 FROM SDG W0107-ITC-104 FIELD SPLIT SAMPLE ID: B0BZL8					SAMPLE ID: B0BZL7 FROM SDG W0107-ITC-104 FIELD SPLIT SAMPLE ID: B0BZL9				
MEDIA: WATER					MEDIA: FILTERED WATER				
PARAMETER	CRDL	B0BZL6 RESULT	B0BZL8 RESULT	RPD	PARAMETER	CRDL	B0BZL7 RESULT	B0BZL9 RESULT	RPD
BARIUM	200	44.8	48.7	8	ALUMINUM	200	ND	42.4	200
CALCIUM	5000	49200	44000	11	BARIUM	200	43.6	ND	200
IRON	100	928	1190	25	CALCIUM	5000	50200	44800	11
MAGNESIUM	5000	8070	8450	7	COPPER	25	ND	2.7	200
MANGANESE	15	31.2	42.5	31	MAGNESIUM	5000	9290	8590	8
POTASSIUM	5000	5160	4530	13	MANGANESE	15	1.8	ND	200
SODIUM	5000	19000	17800	8	POTASSIUM	5000	5290	4680	14
VANADIUM	50	ND	7	200	SODIUM	5000	18400	17900	8
ZINC	20	10.9	ND	200	VANADIUM	50	ND	3.9	200

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INORGANIC FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-6

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SDG NO.: B0C2V7-TMA-786									
SAMPLE LOCATION: SPRING #6, SITE 3 FT., BOTTOM DEPTH									
SAMPLE ID: B0C2R4 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2V7				SAMPLE ID: B0C2R5 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2V8					
MEDIA: WATER				MEDIA: FILTERED WATER					
PARAMETER	CRDL	B0C2R4 RESULT	B0C2V7 RESULT	RPD	PARAMETER	CRDL	B0C2R5 RESULT	B0C2V8 RESULT	RPD
BARIUM	200	29.4	ND	200	ALUMINUM	200	ND	31.4	200
CALCIUM	5000	19800	16600	18	BARIUM	200	28.8	ND	200
IRON	100	106	96	10	CALCIUM	5000	18500	16500	11
MAGNESIUM	5000	4460	3870	14	MAGNESIUM	5000	4160	3880	7
MANGANESE	15	ND	7.2	200	POTASSIUM	5000	ND	817	200
POTASSIUM	5000	ND	769	200	SODIUM	5000	2240	2100	6
SODIUM	5000	2530	2150	16					
SAMPLE LOCATION: SPRING #11, SITE 10 FT., BOTTOM DEPTH									
SAMPLE ID: B0C2V1 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2W0				SAMPLE ID: B0C2V2 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2W1					
MEDIA: WATER				MEDIA: FILTERED WATER					
PARAMETER	CRDL	B0C2V1 RESULT	B0C2W0 RESULT	RPD	PARAMETER	CRDL	B0C2V2 RESULT	B0C2W1 RESULT	RPD
BARIUM	200	28.1	ND	200	BARIUM	200	27.9	ND	200
CALCIUM	5000	18200	17000	7	CALCIUM	5000	18300	16200	12
IRON	100	122	105	15	MAGNESIUM	5000	4160	3830	8
MAGNESIUM	5000	4320	3860	11	POTASSIUM	5000	ND	711	200
MANGANESE	15	ND	6.2	200	SODIUM	5000	2210	2110	6
POTASSIUM	5000	ND	700	200					
SODIUM	5000	2290	2210	4					

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APPENDIX E

RADIOCHEMISTRY VALIDATED DATA SUMMARY TABLES

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	Samp# Date Location Depth Type Comments	BOBZJ2 6-24-94 3-1-5 ---	BOBZJ4 6-24-94 3-1-5 ---	BOBZJ8 6-23-94 3-1-7 ---	BOBZK0 6-24-94 3-1-16C ---	BOBZK2 6-24-94 3-1-21A ---	BOBZK4 6-23-94 3-2-2 ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	93.800	120.000	131.000	0.163 J	21.000	150.000

	Samp# Date Location Depth Type Comments	BOBZK8 6-22-94 3-3-2 ---	BOBZL0 6-22-94 3-3-11 ---	BOBZL2 6-22-94 3-3-11 ---	BOBZL4 6-22-94 3-3-12 ---	BOBZL6 6-23-94 3-4-7 ---	BOBZL8 6-23-94 3-4-7 ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	22.300	96.500	95.700	38.900	42.800	53.000

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sgm 9/22/94

	Samp# Date Location Depth Type Comments	BOBZM0 6-23-94 3-4-10 ---	BOBZM2 6-23-94 3-4-10 ---	BOBZM4 6-22-94 3-4-12 ---	BOBZM6 6-22-94 3-3-11 ---	BOBZM8 6-22-94 3-3-12 ---	BOC2R3 6-23-94 SPRING 6,3 ft 0.00 - 1.58 WATER ---
Parameter	Units	Result Q					
URANIUM	UG/L	42.400	41.500	19.700	0.013	0.020	0.487 J

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	Samp# Date Location Depth Type Comments	BOC2R4 6-23-94 SPRING 6,3 ft 0.00 - 3.17 WATER ---	BOC2R6 6-23-94 SPRING 6,10 ft 0.00 - 2.33 WATER ---	BOC2R7 6-23-94 SPRING 6,10 ft 0.00 - 4.75 WATER ---	BOC2R9 6-23-94 SPRING 6,20 ft 0.00 - 3.17 WATER ---	BOC2S0 6-23-94 SPRING 6,20 ft 0.00 - 6.33 WATER ---	BOC2S2 6-23-94 SPRING 9,3 ft 0.00 - 1.25 WATER ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	0.469 J	0.434 J	0.468 J	0.469 J	0.478 J	0.488

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	Samp# Date Location Depth Type Comments	BOC2S3 6-23-94 SPRING 9,3 ft 0.00 - 2.25 WATER ---	BOC2S4 6-23-94 SPRING 9,3 ft 0.00 - 2.25 DUPLICATE ---	BOC2S7 6-23-94 SPRING 9,10 ft 0.00 - 1.92 WATER ---	BOC2S8 6-23-94 SPRING 9,10 ft 0.00 - 3.75 WATER ---	BOC2S9 6-23-94 SPRING 9,10 ft 0.00 - 3.75 DUPLICATE ---	BOC2T2 6-23-94 SPRING 9,20 ft 0.00 - 2.33 WATER ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	0.501	0.512	0.446	0.494	0.481	0.368 J

	Samp# Date Location Depth Type Comments	BOC2T3 6-23-94 SPRING 9,20 ft 0.00 - 4.67 WATER ---	BOC2T5 6-23-94 SPRING 11,3 ft 0.00 - 1.00 WATER ---	BOC2T6 6-23-94 SPRING 11,3 ft 0.00 - 2.00 WATER ---	BOC2T7 6-23-94 SPRING 11,3 ft 0.00 - 2.00 DUPLICATE ---	BOC2V0 6-23-94 SPRING 11,10 ft 0.00 - 2.50 WATER ---	BOC2V1 6-23-94 SPRING 11,10 ft 0.00 - 5.00 WATER ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	0.465 J	0.467 J	0.442 J	0.459	0.421 J	0.381 J

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	Samp#	BOC2V3 6-23-94 SPRING 11,20 ft	BOC2V4 6-23-94 SPRING 11,20 ft	BOC2V6 6-23-94 SPRING 11 ---	BOC2V7 6-23-94 SPRING 6,3 ft 0.00 - 3.17 SPLIT ---	BOC2W0 6-23-94 SPRING 11,10 ft 0.00 - 5.00 SPLIT ---	BOC2W2 6-23-94 SPRING 11 ---
Parameter	Units	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
URANIUM	UG/L	0.403 J	0.438 J	0.004 UJ	0.480	0.440	0.004 UJ

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APPENDIX F

RADIOCHEMISTRY VALIDATED FIELD DUPLICATE AND FIELD SPLIT SUMMARY

RADIOCHEMISTRY FIELD DUPLICATE AND FIELD SPLIT PRECISION CALCULATION WORKSHEET FOR 300-FF-5

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SDG NO.: W0106-ITC-098			
SAMPLE ID: B0BZL0 FIELD DUPLICATE SAMPLE ID: B0BZL2			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-3-11			
B0BZL0 B0BZL2 PARAMETER RESULT RESULT RPD			
TOTAL URANIUM	98.5	95.7	1
SDG NO.: W0107-ITC-104			
SAMPLE ID: B0BZM0 FIELD DUPLICATE SAMPLE ID: B0BZM2			
SAMPLE LOCATION: GDWTR 2ND QTR 1994, WELL 3-4-10			
B0BZM0 B0BZM2 PARAMETER RESULT RESULT RPD			
TOTAL URANIUM	42.4	41.5	2
SDG NO.: W0108-ITC-097			
SAMPLE ID: B0C2T6 FIELD DUPLICATE SAMPLE ID: B0C2T7			
SAMPLE LOCATION: SPRING #11, SITE 3 FT., BOTTOM DEPTH			
B0C2T6 B0C2T7 PARAMETER RESULT RESULT RPD			
TOTAL URANIUM	0.442	0.459	4

SDG NO.: W0110-ITC-103			
SAMPLE ID: B0C2S8 FIELD DUPLICATE SAMPLE ID: B0C2S9			
SAMPLE LOCATION: SPRING #9, SITE 10 FT., BOTTOM DEPTH			
B0C2S8 B0C2S9 PARAMETER RESULT RESULT RPD			
TOTAL URANIUM	0.494	0.481	3
SDG NO.: W0110-ITC-103			
SAMPLE ID: B0C2S3 FIELD DUPLICATE SAMPLE ID: B0C2S4			
SAMPLE LOCATION: SPRING #9, SITE 3 FT., BOTTOM DEPTH			
B0C2S3 B0C2S4 PARAMETER RESULT RESULT RPD			
TOTAL URANIUM	0.501	0.512	2

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SDG NO.: B0BZJ4-TMA-784			
SAMPLE ID FROM DATA PACKAGE W0107-ITC-104: B0BZJ2 FIELD SPLIT SAMPLE ID: B0BZJ4			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-1-5			
PARAMETER	B0BZJ2 RESULT	B0BZJ4 RESULT	RPD
TOTAL URANIUM	93.80	120	25
SDG NO.: B0BZL8-TMA-784			
SAMPLE ID FROM DATA PACKAGE W0107-ITC-104: B0BZL8 FIELD SPLIT SAMPLE ID: B0BZL8			
SAMPLE LOCATION: GROUNDWATER 2ND QTR 1994, WELL 3-4-7			
PARAMETER	B0BZL6 RESULT	B0BZL8 RESULT	RPD
TOTAL URANIUM	42.80	53	21

SDG NO.: B0C2V7-TMA-786			
SAMPLE ID: B0C2R4 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2V7			
SAMPLE LOCATION: SPRING #8, SITE 3 FT, BOTTOM DEPTH			
PARAMETER	B0C2R4 RESULT	B0C2V7 RESULT	RPD
TOTAL URANIUM	0.47	0.48	2
SDG NO.: B0C2V7-TMA-786			
SAMPLE ID: B0C2V1 FROM SDG W0109-ITC-097 FIELD SPLIT SAMPLE ID: B0C2W0			
SAMPLE LOCATION: SPRING #11, SITE 10 FT, BOTTOM DEPTH			
PARAMETER	B0C2V1 RESULT	B0C2W0 RESULT	RPD
TOTAL URANIUM	0.38	0.44	14

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